

## Selenium Toxicity at Kesterson Reservoir

Selenium is an element that has similarities with sulfur. It is widely distributed in soils, rocks, and water. In small amounts it is a nutrient, in large amounts, a toxin. It might achieve its toxic effect through its ability to replace sulfur in proteins. Selenium poisoning in animals results when they drink contaminated water or ingest Se that has worked its way up the food chain.

1. Imported water → evaporation
2. Salts and trace elements stay
3. salts buildup in the root zone, osmotic potential. *Irrigation causes trace elements to move.*
4. Subsurface **tile drains** were installed to maintain the water table at about 2 meters in depth, reducing water-logging and salt accumulation in the root zone.
5. In **1971**, the 134 km long **San Luis Drain** was terminated at a series of shallow regulating ponds, later known as Kesterson Reservoir,
6. The Bureau constructed this reservoir which was later incorporated into the national wetlands system.
7. Initially Kesterson received some fresh water flows, but by 1982 inflow consisted solely of saline water from subsurface drains, high in trace elements and pesticides.
8. As early as 1981, ranchers in the vicinity noticed livestock abnormalities and death. They questioned the Bureau's operating practices and a rancher, **James Claus**, filed suit and a complaint with the SWRCB. In 1983, a large die-off of birds and later discovered reproductive failure further alerted Fish and Wildlife Service officials to the toxicity of the reservoir.
9. On February 5th, 1985, after a series of evidentiary hearings, the SWRCB ordered the Bureau to revise operating procedures within 6 months or close Kesterson. At the federal level, the House Subcommittee on Water and Power Resources met in Los Baños to investigate Kesterson's toxicity and the Bureau's involvement on March 15th, 1985.
10. During the meeting, the California representative of the Department of the Interior, Carol Hallet, announced that the Bureau was going to shut down the reservoir and **stop water deliveries to 42,000 acres of farmland in the Westland Water District**. This alarmed farmers who depended on the water for irrigation and later the Bureau decided to continue deliveries, phase out Kesterson, and plug all the drains; a process that was completed in May of 1986.
11. No final solution to agricultural drainage exists today and the majority of drainage water in the San Joaquin Valley, approximately **75,000 acre-feet**, is at some point discharged into the **San Joaquin River** (aside from the few evaporation ponds in operation in the region).
12. In April 2001, the Bureau of Reclamation filed with the United States District Court in Fresno a plan of action to provide drainage to the San Luis Unit. Under the court's order, Reclamation must act promptly to provide drainage service to the San Luis Unit. The plan of action provides that Reclamation will evaluate the economic feasibility and the environmental impacts/benefits of all viable drainage alternatives to support a decision on how to provide drainage service to the drainage-affected irrigated lands in the San Luis Unit.